

The following describes a selection process for those facilities.

Step 1: Determine whether you can infiltrate.

There are two possible options for infiltration.

The first option is to infiltrate through rapidly draining soils that do not meet the site characterization and site suitability criteria for providing adequate treatment. See Chapter 3 of Volume III for design criteria for infiltration facilities intended to provide flow control without treatment. In this case, a treatment facility must be provided prior to discharge to the ground for infiltration. The treatment facility ~~could~~ would be located off-line with a capacity to treat the water quality design flow rate or volume (See Volume V, Chapter 4) to the applicable performance goal (See Volume V, Chapter 3). Volumes or flow rates in excess of the design volume or flow rate would bypass untreated into the infiltration basin. (Note that wetpool treatment facilities are always designed to be on-line.) The infiltration facility must provide adequate volume such that the flow duration standard of Minimum Requirement #7, or the water surface elevation requirements of Minimum Requirement #8 will be achieved.

The second option is to infiltrate through soils that meet the site characterization and site suitability criteria in Chapter 7 of Volume V. The facility would be designed to meet the requirements for treatment and flow control. However, since such a facility would have to be located on-line it would be quite large in order to achieve the flow duration standard of Minimum Requirement #7. Therefore this option will, in most cases, be cost and space prohibitive.

If infiltration facilities for flow control are planned, the flow control requirement has been met. Proceed to Step V. If infiltration facilities are not planned, proceed to Step 2.

Step 2: Use the Western Washington Hydrology Model ~~and a flow routing routine~~ to size a detention facility.

Refer to Chapter 2, of Volume III for an explanation of the use of the Western Washington Hydrology Model. Note that the more the site is left undisturbed, and the less impervious surfaces are created, the smaller the detention facility. Additional incentives are given within the model for reducing the disruption of the natural hydrology.

Step V: Select Treatment Facilities

Note: This step-by-step process also appears in Volume V, Chapter 2.

Please refer to Figure 4.1. Use the step-by-step process outlined below to determine the type of treatment facilities applicable to the project.

- Aircraft Maintenance Areas
- Railroad Yards
- Fueling Stations
- Vehicle Maintenance and Repair
- Construction Businesses (paving, heavy equipment storage and maintenance, storage of petroleum products)

If oil control is required for the site, please refer to the General Requirements in Chapter 4, Volume V. These requirements may affect the design and placement of facilities on the site (e.g., flow splitting).

If an Oil Control Facility is required, select and apply an Oil Control Facility. Please refer to the Oil Control Menu in Volume V. After selecting an Oil Control Facility, proceed to Step 3.

If an Oil Control Facility is not required, proceed directly to Step 3.

Step 3: Determine if Infiltration for Pollutant Removal is Practicable.

Please check the infiltration treatment design criteria in Chapter 7 of Volume V. Infiltration can be effective at treating stormwater runoff, but soil properties must be appropriate to achieve effective treatment while not adversely impacting ground water resources. The location and depth to bedrock, the water table, or impermeable layers (such as glacial till), and the proximity to wells, foundations, septic tank drainfields, and unstable slopes can preclude the use of infiltration. Infiltration treatment facilities must be preceded by a pretreatment facility such as a presettling basin or vault, to reduce the occurrence of plugging. [An oil/water separator may serve for pre-settling if it is also necessary for oil control. More frequent maintenance would be necessary to remove solids.](#) Any of the basic treatment facilities, and detention ponds designed to meet flow control requirements, can also be used for pre-treatment.

If infiltration is planned, please refer to the General Requirements in Chapter 4 of Volume V. They can affect the design and placement of facilities on your site. For non-residential developments, if the infiltration site is within ¼ mile of a fish-bearing stream, a tributary to a fish-bearing stream, or a lake, please refer to the Enhanced Treatment Menu (Volume V, Section 3.4). Read the “Where Applied” paragraph in that section to determine if the Enhanced Treatment Menu applies to part of the site or the entire site. If it applies, read the “Note” under “Infiltration with appropriate pretreatment” to identify special pretreatment needs. If the infiltration site is within ¼ mile of phosphorus-sensitive receiving water, please refer to the Phosphorus Treatment Menu (Volume V, Section 3.3) for special pretreatment needs.

If phosphorus treatment is not required for the site, proceed to Step 5.

Step 5: Determine if Enhanced Treatment is Required.

Enhanced treatment is required for:

Industrial project sites,
Commercial project sites,
Multi-family project sites, and

Arterials and highways An urban road with expected average daily traffic (ADT) greater than 7,500; or a rural road or freeway with expected ADT greater than 15,000

that discharge to fish-bearing streams, lakes, or to waters or conveyance systems tributary to fish-bearing streams or lakes. However, such sites listed above that discharge directly (or, indirectly through a municipal storm sewer system) to Basic Treatment Receiving Waters (Appendix I-C), and areas of the above-listed project sites that are identified as subject to Basic Treatment requirements (see Step 6) are also~~Areas of multifamily, industrial and commercial project sites that are identified as subject to Basic Treatment requirements are not~~ subject to Enhanced Treatment requirements. For developments with a mix of land use types, the Enhanced Treatment requirement shall apply when the runoff from the areas subject to the Enhanced Treatment requirement comprise 50% or more of the total runoff within a threshold discharge area.

If the project must apply Enhanced Treatment, select and apply an appropriate Enhanced Treatment facility. Please refer to the Enhanced Treatment Menu in Volume V, Section 3.4. Select an option from the menu after reviewing the applicability and limitations, site suitability, and design criteria of each for compatibility with the site. You may also use Tables 4.1 through 4.3 in this chapter for an initial screening of options.

Note: Project sites subject to the Enhanced Treatment requirement could also be subject to a phosphorus removal requirement if located in an area designated for phosphorus control. In that event, apply a facility or a treatment train that is listed in both the Enhanced Treatment Menu and the Phosphorus Treatment Menu.

If you have selected an Enhanced Treatment facility, please refer to the General Requirements in Chapter 4 of Volume V. They may affect the design and placement of the facility on the site.

If Enhanced Treatment does not apply to the site, please proceed to Step 6.

Step 6: Select a Basic Treatment Facility.

The Basic Treatment Menu is generally applied to:

- Project sites that discharge to the ground (see Step 3), UNLESS:

Step VII: Complete Development of Permanent Stormwater Control Plan

The design and location of the BMPs and facilities on the site must be determined using the detailed guidance in Volumes III, IV, and V. [Operation and Maintenance manuals for each treatment and flow control facility are necessary.](#) Please refer to Chapter 3 for guidance on the contents of the Stormwater Site Plan which includes the Permanent Stormwater Control Plan and the Erosion and Sediment Control Plan.

Table 4.2 Ability of Treatment Facilities to Remove Key Pollutants ^{(1),(3)}						
	TSS	Dissolved Metals	Soap	Total Phosphorus	Pesticides/Fungicides	Hydrocarbons
Wet Pond	Ω	+		+	±	+
Wet Vault	Ω			±	±	±
Biofiltration	Ω	+		±	+	+
Sand Filter	Ω	+		+	±	+Ω
Constructed Wetland	Ω	Ω	Ω		Ω	Ω
Compost Filters	+Ω	+			Ω	Ω
Infiltration(2)	Ω			Ω	+	+Ω
Oil/Water Separator	±			±	±	Ω

Notes:

Ω Major Process

± Minor Process

(1) Adapted from Kulzer; King Co.

(2) Assumes Loamy sand, Sandy loam, or Loam soils

(3) If neither a Major or Minor Process is shown, the Treatment Facility is not particularly effective at treating the identified pollutant

Table 4.3 Screening Treatment Facilities Based on Soil Type			
Soil Type	Infiltration	Wet Pond*	Biofiltration* (Swale or Filter Strip)
Coarse Sand or Cobbles	6	6	6
Sand	4	6	6
Loamy Sand	4	6	4
Sandy Loam	4	6	4
Loam	6	6	4
Silt Loam	6	6	4
Sandy Clay Loam	6	4	4
Silty Clay Loam	6	4	4
Sandy Clay	6	4	4
Silty Clay	6	4	6
Clay	6	4	6

Notes:

4 Indicates that use of the technology is generally appropriate for this soil type.

6 Indicates that use of the technology is generally not appropriate for this soil type

* Coarser soils may be used for these facilities if a liner is installed to prevent infiltration, or if the soils are amended to reduce the infiltration rate.

Note: Sand filtration is not listed because its feasibility is not dependent on soil type.